

MAGNETIZED FAN AND METHOD OF FABRICATING THE SAME

BACKGROUND OF THE INVENTION

The present invention relates in general to a magnetized fan and a method
5 of fabricating the same, and more particularly, to a fan which is fabricated by
injecting magnetic material into the blades of the fan, such that sectors are
constructed by multiple N and S poles.

The conventional fan blades are made of plastic material, such that a
magnetic device such as a magnet in the fan blades, such that fan blades can be
10 used as the fan rotator to interact with the fan stator.

As the conventional fan blades are formed separately with the magnetic
device, more processing steps are required. Further, the magnetic device
occupies an additional volume of space, such that the internal space of the hub is
reduced when the fan blades are attached thereto. As a result, the space for
15 installing the fan stator is restricted, and the number of magnetic poles and
windings are limited to affect the rotating speed of the fan. The performance
of the fan is thus seriously degraded.

SUMMARY OF THE INVENTION

The present invention provides a magnetized fan and a method of
20 fabricating the same. The fan is fabricated by injecting magnetic material into
the fan at the time while the blades of the fan are formed. Thereby, the blades
are intrinsically magnetic without the requirement for installing a magnetic
device. As the magnetic device is not required, the volume of the fan can be
reduced.

The method for fabricating the fan includes the following steps. Firstly, N and S poles are arranged according to the required sectors of the fan. The magnetic material is then injected into the fan in accordance with the arrangement of the sectors. The sectors are then further processed to generate magnetic force.

The fan provided by the present invention includes a hub, a plurality of blades extending radially from a periphery of the hub. The blades include magnetic material to induce a plurality of N and S poles, so as to construct multiple sectors.

These and other objectives of the present invention will become obvious to those of ordinary skill in the art after reading the following detailed description of preferred embodiments.

It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF ACCOMPANIED DRAWINGS

The above objects and advantages of the present invention will be become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

Figure 1 shows a bottom view of a fan provided in a first embodiment of the present invention;

Figure 2 shows a top view of the fan as illustrated in Figure 1; and

Figure 3 shows a flow chart of a method for fabricating the fan.

DETAILED DESCRIPTION OF EMBODIMENT

Referring to Figure 1, the fan 1 includes a hub 10 and a plurality of blades 10 extending radially from a periphery of the hub 10. The hub 10 and the blades 11 can be formed integrally or at separate processing steps. The blades 5 11 can be axial-flow type, centrifugal-flow type, inclined-flow type or transverse-flow type blades to generate and guide a desired air flow.

In this embodiment, magnetic material is injected into bulk material for fabricating the fan 1, such that a plurality of N and S poles are formed to construct a plurality of sectors 12. In the exemplary embodiment as shown in 10 Figure 1, the sectors 12 are distributed along the periphery of the periphery of the hub 10. It will be appreciated that the sectors 12 can also be distributed in other positions such as the edges of the blades 11 as shown in Figure 2. According to specific requirement, the magnetic material can be injected into either the hub 10 or the blades 11 only, or both the hub 10 and the blades 11, 15 such that the sectors 12 can be arranged as required. The fan 1 can be fabricated by various processes such as injection, casting, or powder metallurgy to inject the magnetic material therein. Therefore, when the fan 1 as molded and fabricated is intrinsically magnetic.

The magnetic material includes ferrite magnetic material, SmCo magnetic 20 material, NdFeB magnetic material and FeCoNi magnetic material, for example.

As shown in Figure 3, the present invention further provides a method of fabricating the magnetized fan.

In the first step, the N and S poles are arranged according to the required sectors 12. The sectors 12 can be categorized into axial-, radial-, radiation- or 25 two-directional, or multi-polar. The arrangement of the N and S poles includes isotropic, anisotropic and multi-polar.

The magnetic material is injected into the fan 1 in accordance with the distribution of the sectors 12. In this step, the magnetic material includes ferrite magnetic material, SmCo magnetic material, NdFeB magnetic material and FeCoNi magnetic material, for example. The magnetic material is powdered into magnetic powder, which is further processed. That is, the magnetic material, resin and plastic material are then mixed to form magnetic glue particles, followed by injection, baking, sintering or power metallurgy process.

The sectors 12 of the blade 21 are then magnetized to generate magnetic force. The magnetization process includes magnetizing the fan by electrically conducting the magnetic material. In the magnetization process, a magnetization seat can be used. That is, by disposing the fan 1 in a magnetization seat first, followed by applying a voltage thereto, such that the magnetization discharges transiently to generate a magnetic field and consequently magnetizes the fan 1. The magnetization structure of the magnetization seat includes single-side multi-pole magnetization, complex magnetization, outer circumference multi-pole magnetization or inner circumference multi-pole magnetization.

In addition, before performing the above step, the sectors 12 are arranged according to various requirements. The magnetic field is then analyzed to design the mold. After the mold is developed, the magnetic material is liquefied and injected into the mold to form the fan 1.

Thereby, the magnetized fan can be obtained.

By the method provided by the present invention, the process for fabricating the magnetized fan is shortened. Further, as the fan is magnetized while it is fabricated, no additional external magnetic device is required. Therefore, the fan can be made with a reduced volume, while the pole number

and winding of the fan stator can be maintained or even increased to improve the performance of the fan.

While the present invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those of ordinary skill in the art th various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the appended claims.